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Effects of cultivation medium components on the accumulation of bacillar ribonucleases in the culture liquid of Escherichia coli recombinant strains

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Abstract

The effect of the concentrations of peptone, yeast extract, and inorganic phosphate on the expression of genes of extracellular ribonucleases from Bacillus intermedius 7P (binase) and Bacillus amyloliquefaciens H2 (barnase) was studied in Escherichia coli cells transformed with plasmids containing the structural genes of binase or barnase under the control of their own or synthetic regulatory region or the structural binase gene under the control of the regulatory regions of the genes of barnase or Bacillus pumilus RNase. Inorganic phosphate inhibited the expression of the binase gene under the control of its own regulatory region or the regulatory region of the RNase Bp gene. In all other cases, inorganic phosphate produced no effect on the synthesis of RNases by E. coli cells. This difference in the effects of phosphate may be due to the presence of a nucleotide sequence similar to the E. coli Pho box in the promoters of the binase and RNase Bp genes and the absence of this sequence in the barnase gene promoter. It was shown that high peptone and yeast extract concentrations in the cultivation medium are required for good growth of the recombinant E. coli strains and the biosynthesis of RNases.